



VETERINARY LABORATORY SERVICES (VLS) TESTING BOOKLET

Veterinary Laboratory Services Unit
Veterinary Laboratory Section
Division of Livestock Industry
Department of Agriculture and Agrifood

First Edition 2013
Second Edition 2017
Third Edition 2019
Fourth Edition 2021

Compiled by:
Veterinary Laboratory Services Unit
Veterinary Laboratory Section
Division of Livestock Industry
Department of Agriculture and Agrifood
Ministry of Primary Resources and Tourism
Brunei Darussalam

Copyright 2013

All rights reserved. No part of this book may be reproduced in any form or by any means without prior permission from the Veterinary Laboratory Services Unit, Veterinary Laboratory Section, Division of Livestock Industry, Department of Agriculture and Agrifood, Ministry of Primary Resources and Tourism, Brunei Darussalam

Perpustakaan Dewan Bahasa dan Pustaka Brunei

Cataloguing-in-publication

BRUNEI Darussalam, Veterinary Laboratory Services Unit

Veterinary Laboratory Services (VLS)- VLS Testing/ Brunei Darussalam, Veterinary Laboratory

Services Unit- Bandar Seri Begawan : Jabatan Pertanian dan Agrimakanan, 2013.

p. cm

ISBN 978-99917-38-64-2 (Kulit Keras)

1. Veterinary diagnostic. I. Title.

636.089 BRU (DDC22)

FOREWORD

Alhamdulillah, this Veterinary Laboratory Services (VLS) Testing Booklet was developed to provide farmers, importers of veterinary products and public with information of services available in Veterinary Laboratory Services Unit (VLS), Veterinary Laboratory Section, Division of Livestock Industry, Under the Department of Agriculture and Agrifood.

This booklet contains brief descriptions of laboratory testing provided under VLS.

It also describes the procedure required to obtain laboratory services such as registering processes and guidelines for completing the Test Request Form.

The booklet was produced to fulfill the ISO/IEC 17025 requirement. It also contains the client charters of each testing provided by VLS for client reference as well as test method reference used for laboratory testing.

We hope that the Veterinary Laboratory Services (VLS) Testing Booklet can be used as a guide for farmers, importers and the public who wish to send sample for laboratory testing in VLS.

Finally, I would like to applaud and congratulate the VLS unit for their effort in publishing this guideline. May Allah *Subhanahu wa Ta'ala* bless you all.

Wassalam



[HAJAH MASLIANA YULIAH BINTI ABDULLAH]

Acting Director of Agriculture and Agrifood

CONTENTS

About Us	1
Laboratory Functions	2
Accreditation	3
Method References	3
Laboratory Sub-Units	4
ANIMAL DIAGNOSTIC SUB-UNIT	5
Pathology	6
Histology/ Cytology	6
Parasitology	7
Serology	8
Veterinary Microbiology	9
Clinical Chemistry/ Hematology	10
Molecular Biology	13
VETERINARY PUBLIC HEALTH SUB-UNIT	14
Microbiology	15
Drug Residue	17
Physical Quality	18
FEED AND BIOTECHNOLOGY SUB-UNIT	19
Nutrition and Toxicology	20
Chemical	21

CONTENTS

Chemical	
21	
SALMONELLA REFERENCE LAB	22
CALIBRATION LAB	24
Practical Information	26

ABOUT US

Veterinary Laboratory Services (VLS) is a unit under Veterinary Laboratory Section, Division of Livestock Industry, Department of Agriculture and Agrifood.

VLS was set up and initiated in 1978 at Veterinary Clinic, Jalan Kumbang Pasang and then moved to Jalan Berakas in 1980. By the end of 1988, VLS has moved to its current location.

VLS started of with Diagnostic Services to support the animal health programme. In 1991, VLS started undertaking veterinary services towards Quality Control and Food Safety of food deriving from animal origin.

By 2007, a second laboratory was set up at Jalan Pertanian Luahan, Jerudong for animal feed services to support the development of livestock industry.

LABORATORY FUNCTIONS

VLS Sub-Unit:

- Animal Diagnostic Sub-Unit
- Veterinary Public Health Sub-Unit
- Feed & Biotechnology Sub-Unit
- Salmonella Reference Lab
- Calibration Lab

VLS Main Function:

To support the livestock industry in Brunei Darussalam by providing excellent veterinary laboratory services.

VLS Vision:

Towards an excellent provider of veterinary diagnostic and analytical services.

VLS Mission:

Committed to support livestock industry by providing excellent laboratory services conducted by competent staffs with up-to-date laboratory facilities.

ACCREDITATION

Veterinary Laboratory Services (VLS) is accredited to ISO/IEC 17025:2017 for specific scope within the field of Chemical and Biological Testing by SAC-SINGLAS, Singapore since 2012.

METHOD REFERENCES

Analysis methods used in the laboratories are referenced to international standards and guidelines.

- ISO Standard
- US-FDA BAM
- Association of Analytical Chemists (AOAC)
- APHA
- OIE Guidelines

Method references are given for information purposes only.

VLS reserves the right to select the most appropriate method for processing and testing a sample.

LABORATORY SUB-UNITS

1. ANIMAL DIAGNOSTIC SUB-UNIT:

- Pathology Lab (PHL)
- Histology/Cytology (HCL)
- Parasitology Lab (PRL)
- Serology Lab (SRL)
- Veterinary Microbiology Lab (VML)
- Clinical Chemistry/ Haematology Lab (CCL)
- Molecular Biology Lab (MBL)

2. VETERINARY PUBLIC HEALTH SUB-UNIT:

- Microbiology Lab (MCL)
- Drug Residue Lab (DRL)
- Physical Quality Lab (PQL)

3. FEED & BIOTECHNOLOGY SUB-UNIT:

- Nutrition and Toxicology Lab (NTL)
- Chemical Lab (CML)

4. SALMONELLA REFERENCE LAB (SAL)

5. CALIBRATION LAB (CAL)

TESTING SERVICES PROVIDED

ANIMAL DIAGNOSTIC SUB-UNIT

PATHOLOGY

Diagnose veterinary diseases based on gross appearance of carcasses.

Testing	Method	Client Charter (working days)
Post-Mortem (PM) Examination	CAC/RCP 41-1993	3 days

ANIMAL DIAGNOSTIC SUB-UNIT

Detection of diseases through laboratory examination and analysis
to
support Animal Health Programs to facilitate monitoring, control as
well as eradication of diseases

HISTOLOGY/ CYTOLOGY

Diagnose of veterinary diseases based on histopathological changes at
microscopic level.

Testing	Method	Client Charter (working days)
Conventional Staining Methods	Theory and Practical of Histological Techniques	7 days
Immunohistochemistry Staining Methods	Theory and Practical of Histological Techniques	7 days

ANIMAL DIAGNOSTIC SUB-UNIT

PARASITOLOGY

Diagnose both veterinary endoparasites and ectoparasites infestation.

Testing	Method	Client Charter (working days)
Faecal Flootation Test	The RVC/FAO Guide to Veterinary Diagnostic Parasitology	3 days
Peripheral Blood Smear	OIE Terrestrial Manual 2010	3 days
Egg Count	The RVC/FAO Guide to Veterinary Diagnostic Parasitology	3 days
Coccidian/ Oocysts Count	OIE Terrestrial Manual 2010	3 days

ANIMAL DIAGNOSTIC SUB-UNIT

SEROLOGY

Diagnose veterinary diseases based on antigen-antibody reactions.

Testing	Method	Client Charter (working days)
RAPID TEST		
Avian Influenza Ag Rapid Test	Rapigen Test Kit	1 day
ELISA TEST		
Newcastle Disease (ND)	Zoetis Test Kit	5 days
Infectious Bursal Disease (IBD)	Zoetis Test Kit	5 days
Foot and Mouth Disease (FMD)	PrioCHECK	5 days
Rabies	Platelia Rabies " <i>ad usum veterinarium</i> " Quantitative Assay Protocol	5 days

ANIMAL DIAGNOSTIC SUB-UNIT

VETERINARY MICROBIOLOGY

Provide diagnostic testing for veterinary diseases caused by bacteria and

fungi. The laboratory also offers bacterial screening for animal health

monitoring for livestock industry.

Testing	Method	Client Charter (working days)
Isolation and Identification of <i>Salmonella spp.</i>	ISO6579-1:2017(en)	12 days
Bacteria Isolation & Identification	In-house	12 days
Aerobic Plate (Exposure) / Bacterial Count	Water sample - APHA, Standard Methods for the examination of water and wastewater Swab and Exposure—In House	4 days
Total Coliform / E. coli Count	Idexx, Colilert In-house	3 days

ANIMAL DIAGNOSTIC SUB-UNIT

CLINICAL CHEMISTRY / HAEMATOLOGY

Diagnose veterinary diseases through determination of blood clinical

parameters and haematology.

Testing	Method	Client Charter (working days)
CLINICAL BLOOD CHEMISTRY TEST		
Alkaline Phosphatase*	VetScan VS2 Procedure	3 days
Alanine Aminotransferase*		
Albumin*		
Blood Urea Nitrogen*		
Glucose*		
Calcium*		
Amylase*		
Globulin*		
Phosphorus*		
Creatinine*		
Phosphorus*		
Potassium*		
Total Bilirubin*		
Total Protein*		
Sodium*		

ANIMAL DIAGNOSTIC SUB-UNIT

CLINICAL CHEMISTRY / HAEMATOLOGY

Testing	Method	Client Charter (working days)
COMPLETE BLOOD COUNT		
White Blood Cell Count*	Scil Vet ABC plus+ Hematology Procedure	3 days
Lymphocyte %/# (%/# LYM)*		
Monocyte %/# (%/ # MON)*		
Granulocytes %/# (%/ # GRA)*		
Eosinophils %/# (%/ # EOS)*		
Red Blood Cell Count (RBC)*		
Mean Cell Volume (MCV)*		
Hematocrit (HCT)*		
Mean Corpuscular Hemaglobin (MCH)*		
Mean Corpuscular Hemaglobin Concentration (MCHC)*		
Hemaglobin (HGB)*		
Red Cell Distribution Width (RDW)*		
Platelets Count (PLT)*		
Mean Platelets Volume (MPV)*		

* package testing

ANIMAL DIAGNOSTIC SUB-UNIT

CLINICAL CHEMISTRY / HAEMATOLOGY

Testing	Method	Client Charter (working days)
URINE ANALYSIS		
pH*	Idexx Test Procedure	3 days
Leukocytes (LEU)*		
Protein (PRO)*		
Glucose (GLU)*		
Ketones (KET)*		
Urobilinogen (UBG)*		
Bilirubin (BIL)*		
Blood/Haemaglobin (BLD/HGB)*		
Nitrite (NIT)*		

* package testing

ANIMAL DIAGNOSTIC SUB-UNIT

MOLECULAR BIOLOGY

Confirmatory of veterinary diseases at molecular level (DNA/RNA) as well as determination of species identification / meat speciation.

Testing	Method	Client Charter (working days)
DNA/RNA DETECTION		
H5N1 Avian Influenza PCR	Veredus Test Kit Procedure	5 days
H7 Avian Influenza Real-Time PCR	Avian Influenza Triplex RT-PCR Kit	5 days
H9 Avian Influenza Real-Time PCR	Avian Influenza Triplex RT-PCR Kit	5 days
Rabies	In-house Method	5 days
ANIMAL SPECIATION		
Pork	Neogen Biokits Procedure	5 days
Chicken	Neogen Biokits Procedure	5 days
Beef	Neogen Biokits Procedure	5 days
Sheep	Neogen Biokits Procedure	5 days

VETERINARY PUBLIC HEALTH SUB-UNIT

Analyse food products of animal origin for the detection of pathogens,
veterinary drug residues and physical quality testing towards quality assurance and food safety status

VETERINARY PUBLIC HEALTH SUB-UNIT

MICROBIOLOGY

Provides enumeration and detection of food pathogens in livestock and livestock products to ensure the quality are safe for consumption before distribution. The laboratory also offers hygiene monitoring of the abattoir and processing plants.

Testing	Method	Client Charter (working days)
ENUMERATION		
Aerobic Plate Count*	BAM Chapter 3	7 days
Coliform (MPN)*	BAM Chapter 4	
<i>E.coli</i> (MPN)*	BAM Chapter 4	
<i>Staph. Aureus</i> Count*	BAM Chapter 12	
<i>Clostridium perfringens</i> Count	BAM Chapter 16	
<i>E.coli</i> Count (Petrifilm)*	AOAC 988.08	
Coliform Count (Petrifilm)*	AOAC 988.08	
DETECTION OF PATHOGENS		
<i>Salmonella spp.*</i>	BAM Chapter 5	7 days
<i>Listeria monocytogenes</i>	BAM Chapter 10	
<i>Campylobacter jejuni</i>	BAM Chapter 7	

* package testing

VETERINARY PUBLIC HEALTH SUB-UNIT

MICROBIOLOGY

Testing	Method	Client Charter (working days)
HYGIENE MONITORING		
Swab test (<i>Salmonella spp.</i>)	BAM Chapter 5	7 days
Swab test (<i>Listeria monocytogenes</i>)	BAM Chapter 10	7 days
Aerobic Plate Count	APHA, Compendium of Method for The Microbiological Examination of Foods, Chapter 3	4 days
Air Exposure	APHA, Compendium of Method for The Microbiological Examination of Foods, Chapter 3	4 days

VETERINARY PUBLIC HEALTH SUB-UNIT

DRUG RESIDUE

Provides screening, semi-quantitation and confirmatory testing of veterinary drug residues in tissues of food animal using MIA, ELISA and LC-MS/MS methods.

Testing	Method	Client Charter (working days)
MICROBIAL INHIBITION ASSAY (MIA)		
Penicillin*	USDA MLG34.03	7 days
Tetracycline*		
Erythromycin*		
Streptomycin*		
Neomycin*		
ELISA		
Chloramphenicol	RIDASCREEN Chloramphenicol R1151	7 days
LC-MS/MS		
Tetracycline	In-House Method	7 days
Chloramphenicol	In-House Method	7 days

* package testing

VETERINARY PUBLIC HEALTH SUB-UNIT

PHYSICAL QUALITY

Determination of the eggs' quality (egg freshness) to support the local poultry layer industry and for exportation.

Testing	Method	Client Charter (working days)
EGG QUALITY (EGG FRESHNESS)		
Whole Egg Weight*	TSS Application Note	3 days
Shell-Strength*		
Haugh Unit (HU)*		
Yolk Colour (DSM)*		
Shell Thickness*		

* package testing

FEED AND BIOTECHNOLOGY SUB-UNIT

NUTRITION AND TOXICOLOGY

Determination of animal feed and plant nutritional value, contamination of

mycotoxins as well as determination of gross calorific value.

FEED AND BIOTECHNOLOGY SUB-UNIT

Support and facilitate feed and nutrition programs toward better
quality of livestock products

Testing	Method	Client Charter (working days)
PROXIMATE ANALYSIS		
Moisture*	AOAC 39.1.02 B(a) - In-house Method	14 days
Ash*	AOAC 4.1.10	
Total Oil*	In-House method VLD-NTL-TM-01-ch10	
Crude Fibre*	FOSS Application Note 3428 / Gerhardt Fibretherm Application Note	
Crude Protein*	AOAC 4.2.11	
MYCOTOXIN		
Total Aflatoxins (B, G & M1)	Vicam Test Procedure (AOAC 991.31)	7 days
ENERGY		
Gross Calorific Value	BS EN ISO 9831:2003 Standard	7 days
ANTIBIOTIC RESIDUE SCREENING		
Chloramphenicol	RIDASCREEN Chloramphenicol R15111	7 days

FEED AND BIOTECHNOLOGY SUB-UNIT

CHEMICAL

Provide laboratory testing for the determination of heavy metals/
trace

Testing	Method	Client Charter (working days)
HEAVY METALS		
Arsenic	In-House Method	7 days
Cadmium		
Chromium		
Lead		
Mercury		
Thallium		
TRACE ELEMENTS		
Calcium	In-House Method	7 days
Cobalt		
Copper		
Iron		
Magnesium		
Manganese		
Molybdenum		
Phosphorus		
Potassium		
Sodium		
Zinc		

SALMONELLA REFERENCE LAB

Serves as reference lab to confirm for *Salmonella* and antimicrobial resistance (AMR) analysis to support national monitoring and surveillance programs of *Salmonella* and AMR on the poultry farms

SALMONELLA REFERENCE LAB

Provides confirmatory testing of *Salmonella* serotypes and semi-quantitative measurement of bacteria sensitivity.

Testing	Method	Client Charter (working days)
SALMONELLA SEROTYPING		
<i>Salmonella enteritidis</i>	SSI Test Kit	5 days
<i>Salmonella typhimurium</i>		
<i>Salmonella kedougou</i>		
<i>Salmonella infantis</i>		
<i>Salmonella virchow</i>		
<i>Salmonella kentucky</i>		
<i>Salmonella derby</i>		
<i>Salmonella rissen</i>		
<i>Salmonella Corvallis</i>		
<i>Salmonella weltevreden</i>		
<i>Salmonella gallinarum pullorum</i>		
<i>Salmonella typhimurium monophasic</i>		
<i>Salmonella Stanley</i>		
<i>Salmonella hadar</i>		
<i>Salmonella cerro</i>		
<i>Salmonella give</i>		
<i>Salmonella berta</i>		

SALMONELLA REFERENCE LAB

Testing	Method	Client Charter (working days)
ANTIMICROBIAL SUSCEPTIBILITY TESTING (AGAR DILUTION)		
Ampicillin	CLSI	10 days
Tetracycline		
Chloramphenicol		
Gentamicin		
Cefotaxime		
Ceftazidime		
Streptomycin		
Ciprofloxacin		
Nalidixic acid		
Spectinomycin		
Sulphamethoxazole		
Trimethoprim		
Colisitin		
Penicillin		
Ceftriaxone		
Enrofloxacin		
Erythromycin		
Meropenem		
Vancomycin		
ANTIMICROBIAL SUSCEPTIBILITY TESTING		
Disk Diffusion Method	CLSI	10 days

CALIBRATION LAB

Ensure all laboratory equipment and instrument is accurate, reliable and consistent for use following ISO/IEC 17025 and SAC-SINGLAS requirement

CALIBRATION LAB

Perform in-house calibration and verification of certain laboratory instrument and to make sure all laboratory equipment are calibrated on time as per ISO requirements. The following laboratory instrument and equipment will be

verified internally by this calibration lab:

1. Balance
2. Timer
3. Pipettor
4. Bottle Top Dispenser
5. Incubator

PRACTICAL INFORMATION

Sample:

- Type of sample/ specimen to be tested depends on which laboratory testing is required by the client.
- Sample volumes and packaging varies for different testing.
- Client can refer to VLS Guidelines For Sample Collection and Submission Booklet for further detailed information.
- VLS reserves the right to decline any improper packaging and conditions of samples sent.
- Sample sent will be received by VLS staff and an acknowledgement receipt will be issued to the client.
- Sample sent and left **UNATTENDED** at the VLS receiving counter will not be acknowledged.

Testing Requirements:

- New Clients who wish to send sample for laboratory analysis:
 - ⇒ Must be registered to the Department of Agriculture and Agrifood.
 - ⇒ Must fill in a New Testing Request Form (NTRF) available at the VLS counter.

PRACTICAL INFORMATION

- Client will be briefed on VLS testing services, sample submission and turn-around time of the testing services.
- NTRF will then be processed for approval by Head of Unit.

Sample Receiving Form:

- There are 4 different Test Request Form (TRF) available depending on the tests required:
 - ⇒ Animal Diagnostic Test Request Form
 - ⇒ Veterinary Public Health Test Request Form
 - ⇒ Feed and Biotechnology Test Request Form
 - ⇒ Salmonella Reference Test Request Form
- Client must fill in all the details required in TRF.
- TRF must be filled in using **BLUE INK ONLY**. Corrections must be done by crossing out the mistake and to be initialed by the client.
- Correction pen/ fluid cannot be used in TRF.
- Incomplete TRF will not be acknowledged.

Analysis Results:

- Analysis results will be issued at the end of the testing period as stated in each test.

PRACTICAL INFORMATION

- Client is responsible to collect the analysis results at the VLS counter.
- Analysis result is kept **CONFIDENTIAL**, therefore result will only be emailed to registered client email address.

Sampling Procedure:

- For sampling procedures guidelines please refer to:
 - ⇒ Guidelines For Sample Collection and Submission, Animal Diagnostic (ADG)
 - ⇒ Guidelines For Sample Collection and Submission, Veterinary Public Health (VPH)
 - ⇒ Guidelines For Sample Collection and Submission, Feed and Biotechnology (FB)
 - ⇒ Guidelines For Sample Collection and Submission, Salmonella Reference Laboratory (SAL)

Responsibility and right of customer following ISO 17025:

- ⇒ Clients are to declare if they have family ties with any VLS staff.
- ⇒ Clients shall be informed in advance by VLS of any information that are going to be exposed to public.

- ⇒ Client shall be notified if VLS is required by law to release confidential information unless prohibited by law.
- ⇒ Information regarding client obtained from sources shall be confidential. Sources shall not be shared with client, unless agreed by source.
- ⇒ VLS shall cooperate with client:
 - To clarify client requests.
 - To enter lab concern and monitor laboratory's performance
 - Prepare, pack and dispatch test item when requested.

GENERAL INFORMATION

Sample Receiving Counter open:

Monday–Thursday and Saturday

8.00am until 11:30am

1:30pm until 3:00pm

For any enquiries, please email or contact us at:

veterinarylab@gmail.com

Telephone: +673 - 8965122

Division of Livestock Industry
Department of Agriculture and Agrifood
Ministry of Primary Resources and Tourism
Brunei Darussalam

The laboratory has the facilities suitable for working with agents
in Risk Group 2 Only.